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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|-----------------------------|------------------|
| 10/686,612 | 10/17/2003 | Alex H. Lan | MR1035-1324 | 8938 |
| 4586 7590 03/06/2007 ROSENBERG, KLEIN & LEE 3458 ELLICOTT CENTER DRIVE-SUITE 101 ELLICOTT CITY, MD 21043 | | | EXAMINER FICK, ANTHONY D | |
| | | | ART UNIT 1753 | PAPER NUMBER |
| SHORTENED STATUTORY PERIOD OF RESPONSE | | | MAIL DATE | DELIVERY MODE |
| 3 MONTHS | | | 03/06/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/686,612

Applicant(s)

LAN ET AL.

Examiner

Anthony Fick

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because in line 2, the word "to" appears to be missing between "technique" and "fabricate" and in line 11 "and" is misspelled as "ad". Correction is required. See MPEP § 608.01(b).
2. The disclosure is objected to because of the following informalities: on page 6, line 3 the reference number 28 is used for a mold and there is no corresponding reference number 28 in any of the figures.

Appropriate correction is required.

3. Claims 6, 7, 10, 13 and 15 are objected to because of the following informalities: claims 6, 7, 13 and 15 all contain the language "can be" which does not further limit the structural requirements of the claims. This language does not distinguish if the elements in claims 13 and 15 are required to be present, or if the structure is only capable of having these additional structures. Further, claims 6 and 7 recite limitations of elements that "can be exploited to control the field of view of the detector". These limitations do not add structure and appear to be method limitations or intended use of the device. These limitations will not be given weight for apparatus claims and applicant should correct them if applicant wants these as structural limitations. Claim 10 has a similar problem with the phrase "encapsulation makes use of". Again this appears to be a method limitation not a structure. A possible correction would be "said encapsulation seals said detector by a mold, solder or low-temperature glass". Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 3, 11, 12, 13 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 3 recites the limitation "and is preferably made of" in line 3. It is unclear whether the claim requires that specific composition for the float board or if any composition meets the claim.

7. Claim 11 recites the limitation "contacts are formed thereon" in line 3. As the claim has recited two different substrates, it is unclear whether the contacts are formed on the carrier substrate or the detector substrate.

8. Claim 13 recites the limitation "the main body" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

Art Unit: 1753

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1 through 3, 7 through 11 and 13 through 15 are rejected under 35

U.S.C. 102(b) as being anticipated by Wilner et al. (U.S.P.G.Pub 2002/0139410).

Wilner discloses a thermal radiation sensor as shown in figures 1A, 3B and 5A.

Regarding claim 1, figure 3B shows a detector having a substrate with thermoelectric components formed thereon, 302 with 306 on it, and an encapsulation installed on the substrate to seal the thermoelectric components, 310. Wilner discloses the substrates are created from a silicon wafer (paragraph 0037).

Regarding claim 2, figures 1A, 3B and 5A show the detector comprises a substrate with a cavity portion (404 with 416 in figure 5A), a thin-film float board located above the cavity, a plurality of thermoelectric components formed on the board, an insulating layer above the components and a blackbody radiation absorbing layer covering (see figure 2 for preparation of thermoelectric area and paragraphs 0029-0034 and 0041).

Regarding claim 3, Wilner discloses use of multilayer films to support the thermoelectric components, the multiple layers including silicon oxide and silicon nitride (paragraphs 0029 and 0030).

Regarding claim 7, the claim does not further limit the structure of the device and thus the device of Wilner meets all the structural requirements of the claim and is deemed to be anticipatory.

Regarding claims 8 and 9, Wilner discloses etching a pit in a silicon substrate by both anisotropic and isotropic etching (paragraph 0034).

Regarding claim 10, Wilner discloses use of solder to attach the chips together, thus sealing the detector (paragraph 0033).

Regarding claim 11, figure 5A shows a carrier substrate below the substrate of the detector, 406, and a plurality of external conducting contacts formed, 419.

Regarding claim 13, figure 5A shows it is possible to place a diode or thermosensitive resistor on the carrier substrate.

Regarding claim 14, the external contacts are gold solders.

Regarding claim 15, the device in figure 5A can be packaged onto a circuit board.

11. Claims 1 and 7 through 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Lambert et al. (U.S.P.G.Pub 2003/0141455).

Lambert discloses an infrared sensor with an integrated light concentrator as shown in a plurality of figures.

Regarding claim 1, figure 8 shows a detector having a substrate, 10, with thermoelectric components formed thereon, and an encapsulation, 206, being installed on the substrate to seal the thermoelectric components.

Regarding claim 7, the claim does not further limit the structure of the device and thus the device of Lambert meets all the structural requirements of the claim and is deemed to be anticipatory.

Regarding claims 8 and 9, Lambert discloses etching a pit in a silicon substrate (paragraph 0022). The type of etching does not further limit the structure, therefore the reference is deemed anticipatory for both claims.

Regarding claim 10, Lambert discloses use of glass frit to attach surfaces together, thus sealing the detector (paragraph 0027).

Regarding claim 11, figure 5 shows a carrier substrate below the substrate of the detector, 52, and a plurality of external conducting contacts formed, 74 and 76.

Regarding claim 12, Lambert discloses the device is packaged to a circuit board (paragraph 0026).

Regarding claim 13, figure 5 shows it is possible to place a diode or thermosensitive resistor on the carrier substrate.

Regarding claim 14, the external contacts are solder bumps (paragraph 0026).

Regarding claim 15, the device in figure 5 can be packaged onto a circuit board as disclosed by Lambert.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 4, 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilner as applied to claims 1 through 3, 7 through 11 and 13 through 15 above, and further in view of Lambert et al. (U.S.P.G.Pub 2003/0141455) and Honda (U.S. 6,555,955).

The disclosure of Wilner is as stated above for claims 1 through 3, 7 through 11 and 13 through 15.

The difference between Wilner and claim 4 is the requirement of multi-layer antireflection film provided on the surfaces of the encapsulation. The difference between Wilner and claim 12 is the requirement of a specific substrate.

Lambert teaches an infrared sensor with an integrated light concentrator as shown in a plurality of figures. Figure 8 shows a detector having a substrate, 10, with thermoelectric components formed thereon, and an encapsulation, 206, being installed on the substrate to seal the thermoelectric components. Figure 5 shows a carrier substrate below the substrate of the detector, 52, and a plurality of external conducting contacts formed, 74 and 76.

Regarding claim 4, Lambert teaches the use of antireflection coatings on the encapsulation material (paragraph 0028).

Regarding claim 12, Lambert teaches the device is packaged to a circuit board (paragraph 0026).

Regarding claim 14, the external contacts are solder bumps (paragraph 0026).

Honda teaches a front panel for display. Honda also teaches the use of multi-layer antireflection coatings on either side of a transparent substrate (column 7, paragraph 1).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize antireflection coatings as in Lambert, specifically multi-layer antireflection coatings as in Honda, within the device of Wilner because the antireflection coating permits better infrared transmission through the window of the device and to prevent incident infrared radiation from being reflected off the surface

Art Unit: 1753

(Lambert paragraph 0028) and multilayer coatings are functional equivalents to single layer coatings (Honda column 7, paragraph 1). It would have been further obvious to one having ordinary skill in the art at the time the invention was made to place the multilayer coatings on both inner and outer surfaces to prevent reflection at both silicon/air interfaces and obtain the benefits described by Lambert. Because Wilner, Lambert and Honda are all concerned with maximizing the passage of light through a material, one would have a reasonable expectation of success from the combination. Thus the combination meets claim 4.

Regarding claims 12 and 14, Lambert teaches the use of sensor devices packaged on circuit boards with solder bumps and it would have been obvious to utilize the device of Wilner with a circuit board in the same manner as Lambert.

14. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilner as applied to claims 1 through 3, 7 through 11 and 13 through 15 above, and further in view of DuPree et al. (U.S. 5,315,116).

The disclosure of Wilner is as stated above for claims 1 through 3, 7 through 11 and 13 through 15.

The difference between Wilner and the claims is the requirement of a metal shield layer.

DuPree teaches shields for an infrared detector. DuPree teaches the use of a metal shield layer with an infrared detector (column 1, lines 15-25).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a metal shield layer as in DuPree with the device of Wilner

Art Unit: 1753

because the metal shield layer protects the detector from stray IR radiation (DuPree column 1, lines 19-21) and thus the metal shield allows for more accurate measurement of the IR radiation. Because DuPree and Wilner are concerned with infrared detectors, one would have a reasonable expectation of success from the combination. Thus the combination meets claim 5.

Regarding claim 6, the claim does not further limit the structure of the device and thus the combination of Wilner in view of DuPree meets all the structural requirements of the claim.

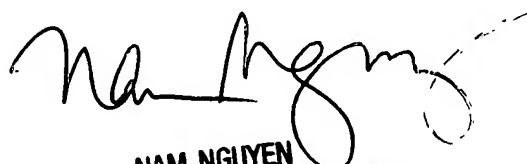
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Fick whose telephone number is (571) 272-6393. The examiner can normally be reached on Monday thru Friday 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1753

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Anthony Fick *ADF*
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